

BAKERY BAG AND METHOD AND APPARATUS FOR MAKING THE SAME

0001 This invention relates to flexible and foldable bags and more particularly, to bags designed to hold food products such as bread. This invention also relates to methods of
5 manufacturing such bags and apparatuses to implement the methods.

BACKGROUND OF THE INVENTION

0002 It is known to construct a plastic bag by folding a continuous sheet of a flexible material, such as thermoplastic, over on itself, then making an in-fold at the folded edge, to form a gusset,
10 and then simultaneously cutting and heat sealing the folded sheet along spaced apart transverse lines that are perpendicular to the fold. Each individual bag formed in this manner has an “W” shaped cross section at the gusset. This type of bag is commonly referred to as a “bread bag” and is often used for packaging loaves of bread. The bread loaf is inserted into the bag through an open end that is opposite the gusset. The open end is then tied shut in an appropriate manner to
15 often present what is called the “pony-tail” end of the bag.

0003 When filled with goods, such as a loaf of bread, bags constructed in this manner have, where the each side sealed edge meets the bottom, a triangular shaped pocket folded into the bag. When the bag is not carefully packaged, the triangular shaped pocket may not fold perfectly inside and thus cause the bottom of the bag to deform or wrinkle. This is a particular problem as
20 bread is often stocked on shelves with the bottom facing the consumer and the bottom contains the product identifying information and the supplier’s trade-marks and logos. Product information and logos are often printed directly on the bag or affixed using a label. Furthermore, this pocket also makes printing material that wraps around the bottom to the sides of the bag difficult. Generally, the pocket does not provide for a very clean look particularly when viewed
25 from the bottom or from the side as the bag is usually transparent or translucent. Furthermore, since traditional bread bags are often transparent, light incident on the food product can decrease the visual quality of the food.

0004 There is therefore a need for improved flexible bags which solves the above problems and can be efficiently manufactured.

SUMMARY OF THE INVENTION

5 0005 The present invention provides an improved flexible bag that has a clean square bottom and can be efficiently manufactured. The improved bag is particularly suited for containing food stuffs.

0006 According to one broad aspect of the present invention, a bag is provided that has improved presentation and ability to keep food fresh comprising a sheet of flexible, foldable
10 material,

- (a) wherein the sheet is coated on one side with metal to define a treated side and an un-treated side;
- (b) wherein the sheet is folded along a fold line such that (i) the treated side faces outwards, and (ii) transversely opposite side edges are defined which are
15 substantially perpendicular to the fold line;
- (c) wherein a gusset is provided centered along the fold line, such that the fold line is in-folded into the bag, thus defining gusseted bottom edges;
- (d) wherein transversely opposite end portions of the gusseted bottom edges are angled edges that angle towards the fold line at a predetermined angle and end at
20 the side edges;
- (e) wherein the sheet is bonded together at adjacent side edges; and
- (f) wherein the sheet is bonded together at adjacent angled edges that have un-treated sides facing each other.

0007 According to another aspect of the invention, a method is provided for manufacturing the
25 bag. The method comprises the following steps:

- (a) coating one side of the sheet with metal defining a treated side and an un-treated side;
- (b) folding the sheet along a fold line such that the treated side faces outwards;

- (c) creating a gusset centered along the fold line by in-folding at the fold line, thus defining gusseted bottom edges and a gusset depth in a direction substantially perpendicular to the fold line;
- 5 (d) making “V” shaped cuts through the gusset, at predetermined intervals in a direction parallel to the fold line, such that the corner of the “V” shape is positioned at a pre-determined length from the gusseted bottom edge and the sides of the “V” shape extends towards and end at the gusseted bottom edges;
- (e) bonding the sheet together at adjacent edges cut in step (d) that have un-treated sides facing each other;
- 10 (f) cutting along a line starting at said corner of each “V” shaped cut and extending in a direction substantially perpendicular to the fold line and ending at a top edge of the bag; and
- (g) bonding the sheet together at adjacent edges cut in step (f).

15 **0008** According to another aspect of the invention, an apparatus is provided to simultaneously make an “V” or “Y” shaped cut and bond resultant edges using heat, comprising:

- (a) a heated block;
- (b) a blade, disposed to produce “V” shaped cuts, coupled to and extending outwards from a top surface of the heated block;
- 20 (c) a lower plate (i) disposed over the heated block, (ii) provided with a hole the shape of and slightly larger than the blade and disposed to receive the blade, and (iii) spring loaded for motion in a direction perpendicular to the top surface of the heated block;
- 25 (d) an upper plate (i) disposed over the lower plate, (ii) capable of motion in a direction perpendicular to the top surface of the heated block, to press on the lower plate such that the blade passes through the hole and contacts the upper plate.

0009 One advantage of present invention is that a bag with a square and flush bottom provides improved presentation. A square and flush bottom presents an improved surface for affixing
30 labels or printing product information and logos. Furthermore, the bag increases the ease with which one can affix labels or print product information on the bag that wraps around the bottom to the sides. Generally, the bag gives an overall cleaner look.

0010 Another advantage of the present invention is that it alleviates the problem of wrinkling and deforming that occurs when bags of the prior art are not carefully filled since the present invention does not have triangular shaped pockets on the bottom face.

0011 Another advantage of the present invention is that by treating one side of the bag with a metal, such as aluminum, food products packages in the bag will stay fresh longer. Treating one side of the bag with metal also reduces the amount of light incident on the food product thereby maintaining the visual quality of the food.

0012 Another advantage of the present invention is that it can be manufactured easily since the cutting and sealing can be performed in single step. This is due, in part, to the treating of one side of the bag with a metal.

BRIEF DESCRIPTION OF THE DRAWINGS

0013 These and other features of the preferred embodiments of the invention will become more apparent in the following detailed description in which reference is made to the appended drawings wherein:

0014 Figure 1 is a front elevation view of a flattened bag of the prior art.

0015 Figure 2 is a perspective view of a filled bag of the prior art.

0016 Figure 3 is a perspective view of a flattened bag according to the present invention.

0017 Figure 4 is a perspective view of a filled bag according to the present invention.

0018 Figure 5 is a front elevation view of a flattened bag without a lip according to the present invention.

0019 Figure 6 is a front elevation view of a flattened bag according to the present invention.

0020 Figure 7 is a cross section at line II-II of the bag of Figure 6.

0021 Figure 8 is a side elevation view of a filled bag according to the present invention.

0022 Figure 9 is a front elevation view of a sheet of material showing the prospective cut and seal lines according to the present invention.

0023 Figure 10 is a front elevation view of a sheet of material with a triangular shape cut out at the gusset.

5 0024 Figure 11 is a side elevation view of an apparatus, for making the cuts and seals of the present invention, with an upper plate, heating block, blade and lower plate.

0025 Figure 12 is a front elevation view of the apparatus of Figure 15.

0026 Figure 13 is a side elevation view of a partial apparatus, for making the cuts and seals of the present invention, with an upper plate, heating block and blade.

10 0027 Figure 14 is a front elevation view of the apparatus of Figure 11.

0028 Figure 15 is a side elevation view of a partial apparatus, for making the cuts and seals of the present invention, with an upper plate and lower plate.

0029 Figure 16 is a front elevation view of the apparatus of Figure 13.

15 **DESCRIPTION OF THE PREFERRED EMBODIMENTS**

0030 In the following description, numerous specific details are set forth to provide a thorough understanding of the invention. However, it is understood that the invention may be practiced without these specific details. In other instances, well-known structures and/or processes have not been described or shown in detail in order not to obscure the invention. In the description and
20 drawings, like numerals refer to like structures or and/or processes.

0031 The methods of the present invention are claimed and described herein as a series of steps. It should be understood that these methods and associated steps may be performed in any logical order. Moreover, the methods may be performed alone, or in conjunction with other procedures and methods before, during or after such methods and steps set forth herein without
25 departing from the scope and spirit of the invention.

0032 Figures 1 and 2 generally show a bag of the prior art used to contain bread. Referring to Figure 1, a flattened bag of the prior art is shown. The bag consists of a sheet of flexible material 110 comprising a top edge 105, bottom edge 106, side edges 103 and apertures 109 proximal to the top edge. The sheet 110 is folded along a fold line 107 substantially perpendicular to the side edges 103 to define (i) a front side 101 and a back side 102, (ii) an exposed portion 141 proximal to the top edge 105 such that the apertures 109 on the back side 102 are not covered, and (iii) an area of overlap 140 between the front side 101 and the back side 102. The fold line 107 is then tucked into the interior of the bag 200 (thus shown as a stippled line) to form a gusset 120 with a gusset height 130 and thus defining new gusseted bottom edges 108. The gusset 120 therefore has a cross-section at line I-I with an "W" shape. Significantly, bags of the prior art are manufactured by cutting and sealing along peripheral edges 103. This results in the peripheral edges 103 at the gusset 120 being bonded together. In other words, all four sheet portions forming the "W" shape of the gusset are bonded together at the edges.

0033 Referring to Figure 2, the bag of Figure 1 is shown when expanded and filled with food product such as a loaf of bread. The sealing of the entire "W" shape at the gusset results in a triangular shaped pocket 150 at the peripheral edges of the bottom surface 116 when expanded. The pocket 150 is defined by folded edges 151, 152, 153 and 154. Folded edges 153 and 154 extend towards the interior of the bag 10. As discussed above, this triangular pocket has numerous disadvantages.

0034 Referring generally to Figures 3, 5, 6 and 7, a bag 200 according to the present invention, shown lying flat, is provided. The bag of the invention comprises a sheet of flexible material which has been coated on one side with metal 210 to define a metal treated side 229 and an untreated side 230. The starting material for the sheet can be any suitable flexible material, preferably, a thermoplastic material. The flexible sheet can be coated with any suitable metal, although aluminum is preferred.

0035 The sheet 210 similarly comprises the top edge 105, bottom edge 106, side edges 103 and the apertures 109 proximal to the top edge. The sheet 210 is folded along the fold line 107 substantially perpendicular to the side edges 103 to define (i) a front side 101 and a back side 102, (ii) an exposed portion 141 proximal to the top edge 105 such that the apertures 109 on the

back side 102 are not covered, and (iii) an area of overlap 140 between the front side 101 and the back side 102. Importantly, as shown in Figure 7, the sheet 210 is folded such that the metal treated side 229 forms the outside of the bag 200 and the untreated side 230 forms the inside of the bag 200. The fold line 107 is then tucked into the interior of the bag 200 (thus shown as a stippled line) to form the gusset 120 with gusset height 130 and thus defining new gusseted bottom edges 108. Referring specifically to Figures 6 and 7, the gusset 120 again has a cross-section at line III-III with an “W” shape.

0036 Transversely opposite ends portions of the gusseted bottom edges 108 are angled edges 220 that angle upwards at a predetermined angle 225 and end at side edges 103. The angle 225 can be from 30-60 degrees but is preferably about forty-five degrees. Also, the angled edges 220 preferably end at the side edges 103 at about a gusset height’s length from the gusseted bottom edges 108, thus ending about where the fold line 107 meets the side edges 103. The side edges 103 are bonded to each other. The angled edges 220, only of adjacent sheets that have un-treated sides 230 facing each other, are bonded to each other. Therefore, since the angled edges 220 are in the gusset 120 portion of the bag, only those portions of the sheet representing a peak on the “W” shape of the gusset 120 are bonded together.

0037 Referring to Figure 5, in one embodiment of the invention, the bag has no exposed portion 141 and no apertures 109 proximal to the top edge 105.

0038 Referring to Figures 4 and 8, the bag 200 is shown when filled with food product such as a loaf of bread. When the bag 200 is expanded, the bag 200 presents a square and flush bottom and side without any folds or pockets. As discussed earlier, this absence of fold or pockets, along with the metal coating, results in a variety of advantages regarding presentation and freshness.

0039 According to another aspect of the invention, a method is provided to manufacture a metal coated bag with a flush square bottom. The method comprises the following steps. Coating a flexible sheet with a suitable metal so that one side is treated and the other is un-treated. Folding the sheet along a fold line such that the treated side faces outwards. Creating a gusset of a pre-determined depth by in-folding at the fold line. Making an angular cut, in a “V” shape, on the sheet through the gusset such that the tip of the “V” is positioned at a pre-determined length from the gusseted bottom and the sides of the “V” extend towards and end at the gusseted edge.

Bonding the sheet together at adjacent edges of the “V” shaped cut that have un-treated sides facing each other. Cutting along a line starting at the tip of each “V” shape and extending in a direction perpendicular to the fold line and ending at a top edge of the bag and then bonding the resulting edges together. This cutting and bonding is repeated along a length of the sheet, in a direction parallel to the fold line, to manufacture multiple bags.

0040 The sheet can be of any flexible, foldable material, including but not limited to a thermoplastic material. Methods for producing a sheet of thermoplastic material are well known and typically consist of extruding a lay flat tube of thermoplastic material and edge slitting the lay flat tube on both sides to produce 2 layers of film.

0041 Any suitable metal can be used to coat the sheet. Preferably, aluminum is used and methods to coat thermoplastic material using aluminum, such as for potato chip bags, are well known in the art and will not be described here. Coating thermoplastic materials can involve an intermediate treatment to enable the metal to adhere to the material.

0042 Referring to Figure 9, the “V” shaped cuts are shown as solid lines formed by line segments 901-900 and 900-902. In a preferred embodiment of the invention, the “V” shape has about a ninety degree angle. Referring to Figure 10, a folded sheet is shown with multiple “V” shapes cut out along the length of the sheet. The bag is then bonded along the edges where the “V” shape cut has been made, but only where un-treated sides face each other. Thus, only the peaks of the “W” in the “W” shaped gusset, are bonded together and the valley in the middle of the “W” is not.

0043 The cut extending from the corner of the “V” shape is shown as a solid line formed by line segment 900-903. The resultant edges are bonded together. This results in an overall cut in the shape of a “Y”. As generally illustrated by Figures 9 and 10, the manufacture of multiple bags is accomplished by repeating this “Y” shaped cut along the length of the sheet.

0044 In a preferred embodiment of the invention, cutting and bonding are performed in a single step. This is possible since the sheet has been treated on one side with aluminum and this side is on the outside of the bag. When the edges are cut, bonding using heat is simultaneously performed. This advantageously only bonds the desired edges together. Cutting the “V” shape

while heating the resultant edges will result only in the sheet portions forming the peaks of the “W” being bonded together because only the peaks have un-treated sides facing each other. In contrast, sheets portions forming the valley of the “W” shape will not be bonded together because the edges that face each other have been treated with a metal such as aluminum. With respect to the cut extending from the corner of the “V” shape, the resultant edges will have un-treated sides facing each other. Consequently, the edges will be bonded together as desired.

0045 According to another aspect of the invention, an apparatus 500 is provided to simultaneously make the “V” or “Y” shaped cuts of the method described above. Referring to Figures 11 and 12, the apparatus 500 is comprised of a heated block 501, a “V” shaped blade 502, a lower plate 508 and an upper plate 505. Although a “V” shaped blade is preferable, it will be understood by those skilled in the art that blades of other shapes, such as a triangle, can create similar “V” shaped cuts. The blade 502 is attached to and extends outwards from a top surface of the heated block 501. Preferably, the heated block 501 is comprised of separable cast metal layers machined to hold a replaceable heating means.

0046 The lower plate 508 is disposed over the heating block and comprises a metal stripper plate 510, an insulating plate 509 attached to a top surface of the stripper plate, and springs 503 that allow the lower plate 508 to move in a direction perpendicular to the top surface of the heated block 501. The springs 503 of the lower plate 508 are attached to a ground surface 520, preferably by shoulder bolts 504. The lower plate further comprises a hole the shape of and slightly larger than the blade 502 and disposed to receive the blade 502.

0047 The upper plate 505 is disposed over the lower plate 508 and comprises a clamp plate 506 and a resilient surface 507 on an underside of the clamp plate 506. Furthermore, the upper plate 505 is capable of motion in a direction perpendicular to the top surface of the heated block 501. In some preferred embodiments of the invention, the upper plate is pneumatically driven.

0048 In operation, the blade 502 is heated by the heater block 501. A sheet of material is placed in between the upper plate 505 and the lower plate 508. The upper plate 505 is driven downwards and presses on the lower plate 508. This causes the lower plate 508 to move down and the blade 502 to move through and exit the topside of the hole on the lower plate 508. The exiting blade 502 thus presses against the upper plate 505. This action results in a “V” shaped cut

in the material in between the upper plate 505 and the lower plate 508 using the heated blade 502. Since the blade 502 is heated, suitable materials and surfaces will be bonded simultaneously with the cut. In another embodiment of the invention, a “Y” shaped blade is used to produce “Y” shaped cuts. Figures 13-16 illustrate a partial apparatus with different components showing in
5 order to more clearly illustrate individual components.

0049 Although preferred embodiments of the invention have been described herein, it will be understood by those skilled in the art that variations may be made thereto without departing from the spirit of the invention or the scope of the appended claims.